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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/709,357	04/29/2004	Anil K. Chinthakindi	FIS920040031US1	3356
29371	7590	07/27/2005		
CANTOR COLBURN LLP 55 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002			EXAMINER TRINH, MICHAEL MANH	
			ART UNIT 2822	PAPER NUMBER

DATE MAILED: 07/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No.		Applicant(s)	
	10/709,357		CHINTHAKINDI ET AL.	
	Examiner		Art Unit	
	Michael Trinh		2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) 11-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5,9 and 10 is/are rejected.
- 7) ☒ Claim(s) 6-8 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>4/29/04 & 5/7/05</u> . | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

*** This office action is in response to Applicant's election filed on June 6, 2005. Claims 1-30 are pending, in which claims 11-30 are non-elected without traverse.

Election/Restrictions

1. Claims 11-30 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim.

Election was made without traverse in Paper mail date June 06, 2005.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(c) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

3. Claims 1-4,9-10 are rejected under 35 U.S.C. 102(e),(a) as being anticipated by Volant (6,635,506).

Volant teaches a method for forming a transmission line structure for a semiconductor device comprising at least the steps of: forming an interlevel dielectric layer 100 over a first metallization level (Fig 13; col 6, lines 27-36; col 5, lines 40 through col 5); removing a portion of the interlevel dielectric layer and forming a sacrificial material 130 filled cavity within the void created by the removal of the portion of the interlevel dielectric layer (Fig 15; col 6, line 37 through col 7); forming a signal transmission line 160 in a second metallization level formed over the interlevel dielectric layer, the signal transmission line being disposed over the sacrificial material; removing a portion of dielectric material included within the second metallization level so as to expose the sacrificial material (figs 17-18; col 7, lines 22-57), wherein a portion of the sacrificial material is exposed through a plurality of access holes 175 (Fig 18; col 7, lines 22-34; Fig 5) formed through the signal line; and removing the sacrificial

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material so as to create an air gap 180 beneath the signal transmission line (Fig 19). Re claim 2, wherein a support structure of the dielectric layer 100 is remained (Figs 14,15,19). Re claim 3, wherein the support structure of the dielectric layer 100 comprises a continuous rail (Figs 5,3,4). Re claim 4, wherein the support structure of the dielectric layer 100 comprises a plurality of individual posts at both ends (Figs 5,2). Re claim 9, wherein the sacrificial material 130 comprises an organic dielectric (col 5, line 46 through col 7). Re claim 10, wherein the sacrificial material 130 is removed by a dry plasma etch (col 7, lines 40-47).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

5. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Volant (6,635,506) taken with Petrarca (6,597,068).

Volant teaches a method for forming a transmission line for a semiconductor device as applied to claims 1-4, 9-10 above.

Volant also teaches (at col 1, lines 42-49; col 5, lines 55-61; Fig 11) forming a ground plane in the interconnect metallization level comprising a back end of line metallic material, but lacks mentioning completely encapsulate the metallic material within a liner material.

However, Petrarca teaches (at Fig 2E, 2A-2E; col 1, lines 25-32; col 3, lines 44 through col 4) forming a ground plane within a metallization level, wherein the ground plane comprises

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a back end of line metallic material 24 completely encapsulated within a liner material 22/25 (Figs 2D-2E; col 4, lines 5-25).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the signal transmission line of Volant on the ground plane comprising a back end of line metallic material completely encapsulated within a liner material as taught by Petrarca. This is because of the desirability to form a multilevel of metallization, wherein the liner material completely encapsulated the metallic material would act as a barrier layer for preventing interdiffusion between the materials.

Allowable Subject Matter

6. Claim 6-8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The references of record do not fairly anticipatively teach or fairly make a prima facie obvious case of the claimed method of claim 6, in which the method further includes forming a pair of coplanar shielding lines adjacent the signal transmission line in the second metallization level.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael M. Trinh whose telephone number is (571) 272-1847. The examiner can normally be reached on M-F: 8:30 Am to 5:00 Pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (571) 272-1852. The fax phone number is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application should be directed to the receptionist whose telephone number is (703) 308-0956.

Oacs-17



Michael Trinh
Primary Examiner